SIGNALING THEORY IN DIVIDEND POLICY

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Purpose: The purpose of this paper is to examine the signaling theory of dividend policy in companies that are listed on the Warsaw Stock Exchange.

Design/methodology/approach: Based on the literature review of signaling theory in dividend policy, the research hypothesis was stated: There is no relationship between future earnings and current dividend payments in the financial statements of Warsaw listed companies during the studied period 2010-2021. Accordingly, an empirical model was built which consisted of an explanatory variable (dividend in subsequent years) and explanatory variables (earnings in subsequent years). In addition, a research questionnaire was conducted for individual investors who have been investing in the Warsaw Stock Exchange for more than one year.

Findings: The estimation results of the econometric model confirmed that there is no relationship between the dividend paid and the profit of a given company. On the other hand, the survey results indicated that dividend policy is an important element in the decision-making process of individual investors in the stock market.

Originality/value: The research in the paper is complementary in nature – the signaling theory in dividend policy was examined in a multifaceted manner – econometric testing of the model and qualitative research in the form of a survey among 100 investors.

Keywords: finance, signaling theory, dividend policy.

Category of the paper: own research.

1. Introduction

Its basic feature was a decrease in the share of companies paying dividends in the total number of companies, a decrease in payout rates and dividend rates with an increase in the value and concentration of payouts. Based on the data presented, it can be assumed that companies will want to share profits with their shareholders in the future as well. The analysis of the literature and the number of studies on the topic of signaling theory in dividend policy indicates that this problem has not been clearly resolved. In view of the literature analysis conducted on the topic of signaling theory in dividend policy, a hypothesis is proposed:

H0: There is no relationship between future earnings and current dividend payments in the financial statements of Warsaw listed companies during the studied period 2010-2021.

For this purpose, a database consisting of companies that paid dividends between 2010 and 2021 was created.

2. Literature Review

The thesis "dividend policy contains some information about future earnings" was implemented to the field of finance by authors Bhattacharya (1979), Miller and Rock (1985), and John and Williams (1985) (Kaźmierska-Jóźwia,k 2017). Signaling theory is a theory that determines the relationship between dividends and stock price. S. Bhattacharya says dividends serve as a signal of future cash flows. Although dividends have no tax benefits, a company will choose to pay them to send a positive signal to shareholders and outside stakeholders. On the other hand, the research of M. Lintner (1957) indicated that an increase in dividends is usually a signal of a permanent change in the level of profit, and not an announcement of a one-time increase in profits in the future (Żyła, 2018). The decision to pay a dividend and the moment of its payment itself is particularly observed by investors who hold shares of a given company in their portfolio and by investors who are potentially interested in buying them. The observation and analysis of these two moments (the announcement of the decision to pay and the moment of the payment itself) is a signal to all investors about the financial health of the company – although undoubtedly the managers of the company who are involved in the management are definitely better informed about the financial situation than the investors themselves. The perception of dividends as a specific information tool was first noticed in their research by M. Miller and F. Modigliani. These considerations were joined by S. Bhattachary, who was the first to create the concept and assumptions about dividends in signaling theory. According to the author, any change in dividend policy communicated by a company to its shareholders is at the same time a specific informational message. A company that makes a public announcement regarding the payment of dividends has a clear basis for doing so. Most often, the announcement of such a decision is preceded by the determination of long-term plans and financial situation within the company. In literature, the importance of dividends in the context of their payment and share prices was also studied. A significant increase in market prices is preceded by an announcement of an increase in the amount paid, and a decrease results in a decrease in prices on the day of the dividend payment announcement and the day after the announcement. On a similar topic, a study was conducted using a sample of 310 companies, where the results indicated that there is a relationship between future earnings and unexpected current dividend changes (Watts, 1973). The study also used a key property common to dividend signaling models-the higher the taxation of dividend income relative to capital gains

income, the greater the value of the information revealed by a particular dividend rate-but the study did not indicate a relationship between dividends and their information content (Healy, Palepu, 1988).

3. Methodology

Due to the literature review conducted on the analyzed topic of signaling theory in dividend policy, hypothesis H0 is posed, which is a continuation of the research on signaling theory in dividend policy.

H0: There is no relationship between future earnings and current dividend payments in the financial statements of Warsaw listed companies during the study period 2010-2021.

In order to accept or reject the hypothesis in the most important stage of the study, a multiple regression of the following values will be estimated:

$$\text{Profit}_t = 1 + \text{Profit}_{t-1} + \text{Profit}_{t-2} + \text{Dividends}_{t-1} + \text{Dividends}_{t-2} + (1|id) \tag{1}$$

where:

t – 2010, ..., 2022,

$i = 1, ..., n$ (number of WSE companies that paid dividends),

$E_{i,t}+1$ – company's profit in year $t+1$,

iD_{it} – declared dividend in year t,

ε – value of random component.

The conclusions drawn from the multiple regression will be complemented by a survey of investors. The survey was addressed to investors who independently make investments on the Warsaw Stock Exchange.

4. The empirical study

A linear mixed regression model was used that allowed for the inclusion of repeated measures for each observation. This model is quite robust to both the effect of violating distributional assumptions of random effects variance and residuals and to distributions with marked differences from normality (Schielzeth et al., 2020). The mixed linear regression equation is shown in (2).

$$y|x,u=x'\beta+z'u+\epsilon \tag{2}$$

where x were the factors with (fixed) effects to be examined, with the notation of the effects as β. Factors with u effects only contributed to the variation in $y|x$. The model assumptions were formulated using equations 2.1-2.3:

$$u \sim N(0,G) \tag{2.1}$$

$$\epsilon \sim (0,R) \tag{2.2}$$

$$Cov(u,\epsilon) = 0 \tag{2.3}$$

In the current analysis, it was assumed that the random effects were sampled from a multivariate Gaussian distribution $N(0,G)$. The fixed and random effects β and u were determined by maximizing the joint density $f(y,u)$. The significance of the effect of profit and dividends of the previous two years on the profit of the following year in linear mixed model notation was examined using the following formula.

$$Profit_t = 1 + Profit_{t-1} + Profit_{t-2} + Dividends_{t-1} + Dividends_{t-2} + (1|id) \tag{3}$$

where $(1|id)$ – random intercept of grouping variable (firm's id) with fixed mean.

The model was characterized by a good differentiation of companies in terms of profit, ICC = 0.70, which made it possible to use a mixed model. The *p-value* for univariate categorical data was computed from the asymptotic chi-squared distribution of the test statistic without continuity correction. The financial results (profit, gross and net dividends) of 35 companies over the period 2015-2020 was analyzed. The main descriptive statistics of the study sample by year were shown in Table 1.

Table 1.
Signaling theory in dividend policy

Financial performance	Year	N	M	SD	Mdn	IQR	Min	Max
Profit	2015	34	244,75	642,84	79,59	93,22	-17,15	3233
	2016	34	345,43	1035,15	71,3	126,27	4,64	5740
	2017	34	408,99	1295,43	73,17	142,03	6,91	7173
	2018	34	363,29	1073,5	67,31	134,75	12,04	5604
	2019	34	256,1	759,89	74,63	78,8	-263	4298
	2020	34	421,48	1370,26	88,96	105,88	-1507	7340
Gross dividends	2015	27	2,29	3,89	1,30	2,62	0	20,00
	2016	30	2,72	4,83	0,61	2,77	0	20,00
	2017	35	3,06	5,37	0,70	2,76	0	22,00
	2018	35	3,29	5,73	0,89	2,75	0	25,00
	2019	34	3,26	5,23	1,00	3,43	0	25,00
	2020	34	3,19	6,49	0,82	2,66	0	30,00
Net dividends	2015	27	1,86	3,15	1,05	2,12	0	16,20
	2016	30	2,21	3,91	0,49	2,25	0	16,20
	2017	35	2,48	4,35	0,57	2,23	0	17,82
	2018	35	2,66	4,64	0,72	2,21	0	20,25
	2019	34	2,64	4,24	0,81	2,78	0	20,25
	2020	34	2,59	5,26	0,67	2,15	0	24,30

Sources: own research.

Results

The results of a linear mixed model fitting based on equation (3) are shown in Table 2.

Table 2.

An empirical study of signaling theory in dividend policy

Predictors	Profit $_t$		
	Estimates	CI	P
(Intercept)	75.88	-62.98-214.73	0.281
Profit $_{t-1}$	0.62	0.31-0.93	**<0.001**
Profit $_{t-2}$	0.31	-0.01-0.62	0.055
Dividends $_{t-1}$	-9.66	-65.20-45.89	0.731
Dividends $_{t-2}$	5.59	-53.77-64.95	0.852

Note: marginal R^2= 0.72, observations = 123, N_{id} = 34[1].

Sources: own research.

The implemented model showed the significance of only the profit factor at time *t-1* on the profit at time t. An increase in profit at *t-1* will cause an increase in profit at *t* of 0.62. The effect on the dependent variable profit at time *t-2*, although not significant at $\alpha = 0.05$, was significant at the trend level and had a half size positive effect compared to profit at time *t-1*. The significance of the effect of the value of dividends paid (both gross and net) in the last two years on dependent variable not shown. Frequency distributions, percentages, and goodness-of-fit test statistics for responses to the research questions are presented in Tables 3-11.

Table 3.

Frequency of responses, percentages, and statistical test results to the research question «Does an investor pay attention to the fact that it pays dividends when selecting a company for their investment portfolio?» (N = 50)

Responses					Hypothesis testing		
Yes	Rather yes	Rather no	No		χ^2	df	P
35 (70%)	10 (20%)	3 (6%)	2 (4%)		57.04	3	**<0.001**

Source: own research.

Most investors (35 respondents) pay attention to dividends paid by companies when selecting new financial instruments for their portfolio. For those investors (10 respondents) who are not completely sure, dividends paid by companies may be a factor that positively influences their decision to purchase a given financial instrument.

Table 4.

Frequency of responses, percentages, and statistical test results to the research question «Is the dividend policy informative about the financial health of the company?» (N = 50)

Responses					Hypothesis testing		
Yes	Rather yes	Rather no	No		χ^2	df	P
24 (48%)	16 (32%)	8 (16%)	2 (4%)		22.0	3	**<0.001**

Source: own research.

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[1] One company's data was not included to the model due to missing data.

Investors who responded to the question in Table 4 recognize that the dividend policy pursued in companies is information about the financial health of the company (24 responses – "yes", 16 responses – "rather yes"). The distribution of answers divided in this way confirms in practice that dividend policy is important from the point of view of investors' decisions to buy shares.

Table 5.
Frequency of responses, percentages, and statistical test results to the research question: «Does the dividend policy affect the valuation of shares of companies that pay out dividends to their shareholders?» (N = 50)

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*P*
30 (60%)	13 (26%)	6 (12%)	1 (2%)		38.48	3	**<0.001**

Source: own research.

Investors who responded to the question in Table 5 believe that the dividend policy pursued influences the value of shares of a given company that pays out this dividend (30 responses – "yes", 13 responses – "rather yes"). The result obtained at this level gives 76% of all answers in the whole survey. The distribution of answers divided in this way confirms in practice that the dividend policy is important from the point of view of the decisions made by investors. In addition, the dividend policy was assessed as a positive determinant affecting the value of shares.

Table 6.
Frequency of responses, percentages, and statistical test results to the research question: «Is the dividend policy of Polish companies clearly understood by the investors?» (N = 50)

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*P*
5 (10%)	22 (44%)	15 (30%)	8 (16%)		13.84	3	**0.003**

Source: own research.

Investors who responded to the question in Table 6 believe that the dividend policy pursued in Polish joint-stock companies is not fully understood and clear to investors who are interested in dividend policy (5 "yes" answers, 22 "rather yes" answers). The result obtained at this level gives 54% of all answers in the survey. The remaining 46% of all survey responses indicate that investors have a negative view of the way Warsaw listed companies communicate about their dividend policy.

Table 7.
Frequency of responses, percentages, and statistical test results to the research question: «Is information on dividend policy communicated systematically by companies listed on the WSE?»

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*p*
11 (22%)	20 (40%)	17 (34%)	2 (4%)		17.4	3	**<0.001**

Source: own research.

Investors who gave a positive answer to the question in Table 7 recognize that information about dividend paid does not appear regularly (11 answers – "yes", 20 answers – "rather yes"). The result obtained at this level gives 62% of all answers in response to the question posed in the survey. The remaining 38% of all survey responses indicate that investors have a negative view of the way Warsaw listed companies communicate about their dividend policy as a result of a lack of continuity in dividend payments to investors.

Table 8.
Frequency of responses, percentages, and statistical test results to the research question: «Is the lack of continuity in dividend payments in subsequent years perceived negatively by investors?»

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*P*
29 (58%)	18 (36%)	3 (6%)	0		43.92	3	**<0.001**

Source: own research.

Investors who gave a positive answer to the question in Table 8 consider that the lack of continuity in dividend payments to shareholders is not a positive signal concerning the company's financial condition (29 answers – "yes", 18 answers – "rather yes"). The result obtained at this level gives 94% of all answers in response to the question posed in the survey.

Table 9.
Frequency of responses, percentages, and statistical test results to the research question: «Do companies have a continuous dividend policy?»

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*p*
30 (60%)	17 (34%)	2 (4%)	1 (2%)		45.52	3	**<0.001**

Source: own research.

Investors who gave a positive answer to the question in Table 9 recognize that companies that have decided to pursue a dividend policy continue to pursue it in future periods (30 answers – "yes", 17 answers – "rather yes"). The result obtained at this level gives 84% of all answers in response to the question posed in the survey.

Table 10.
Frequency of responses, percentages, and statistical test results to the research question: «Are changes in dividend policy (change of value of dividend paid) perceived positively by investors?»

Responses					Hypothesis testing		
Yes	*Rather yes*	*Rather no*	*No*		χ^2	*df*	*p*
22 (44%)	18 (36%)	8 (16%)	2 (4%)		20.08	3	**<0.001**

Source: own research.

Investors who gave a positive answer to the question in Table 10 consider that information about a change in the level of dividend paid is a positive signal for stock exchange investors (22 answers – "yes", 18 answers – "rather yes"). The result obtained at this level gives 80% of all answers in response to the question posed in the survey. Significant goodness-of-fit test scores indicated significant differentiation among subjects within each question.

5. Summary

Dividend policy and the research conducted in connection with it, occupy a lot of space in literature studies. Thus, it is possible to identify and define a wide variety of factors that affect its existence and application in companies. Macroeconomic and microeconomic factors influence the development of dividend policy and the way the company itself operates. The third group, which is the most difficult to measure and quite unpredictable, is the group of behavioral factors. This group includes primarily the behavior of individual investors, whose reactions and decisions can significantly affect the price of company shares. The empirical research carried out in the first part of the article indicates that the dividend paid in year t does not matter for the profits in period t+1. Therefore, the hypothesis presented in the paper should be accepted:

H0: There is no relationship between future earnings and current dividend payments in the financial statements of Warsaw listed companies during the studied period 2010-2021.

On the other hand, research addressed to individual investors who transfer their funds to purchase financial instruments on the Warsaw Stock Exchange determines that investors pay attention to whether the company pays dividends (Table 3). Additionally, the majority of respondents positively assess the financial condition of the company that pays dividend (Table 4). Among all the respondents, the vast majority expressed the belief that dividend paid affects the value of share prices (Table 5). On the other hand, investors rather negatively assess the information message sent by companies to the market regarding their dividend policy (Table 6-7). The change in the value of dividend paid is also not a positive phenomenon in the opinion of investors (Table 8). A positive situation for investors is the continuation of companies in paying dividends to shareholders and the change in the value of dividends paid (Table 9-10). In view of the research conducted, it should be considered that dividend policy is more important from the field of behavioral finance. On the other hand, during the studied time period and with the given number of companies, it was not possible to confirm the relationship between the dividend paid in year t and the profits earned in year t+1. It seems reasonable to conclude that the signaling theory in dividend policy is not applicable.

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